

**2019 North Dakota Data Requirements Rule Report**  
**North Dakota Department of Environmental Quality**  
**Division of Air Quality**

**1. History of the Data Requirements Rule:**

EPA's Data Requirements Rule (DRR, 80 FR 51052) was promulgated to produce SO<sub>2</sub> concentration data so that informed decisions may be made on designations for the 2010 1-hour SO<sub>2</sub> National Ambient Air Quality Standard (NAAQS). Because of the tendency of SO<sub>2</sub> concentrations to be highest near larger sources of SO<sub>2</sub>, EPA designed the DRR to require collection of SO<sub>2</sub> data near larger sources. The final version of the DRR allowed for States to fulfill their requirements using data based on either ambient monitoring or dispersion modeling. Of the sources required to produce SO<sub>2</sub> data for the DRR in North Dakota, only one chose to use data based on ambient monitoring. All the other DRR sources chose to produce SO<sub>2</sub> data using dispersion modeling. This annual DRR report addresses requirements for SO<sub>2</sub> sources that produced data using dispersion modeling.

Because of a lawsuit filed by the Sierra Club and Natural Resources Defense Council, requirements to produce SO<sub>2</sub> data for designations proceeded in stages. The outcome of that lawsuit was a Consent Decree (with EPA) on March 2, 2015, that accelerated the data submission and designation schedule for certain sources. In North Dakota, the SO<sub>2</sub> sources that were required to submit SO<sub>2</sub> data earlier because of the Consent Decree (CD) were: Coyote Station (Coyote), Coal Creek Station (CCS), and Leland Olds Station (LOS). CCS and LOS are close enough to each other that they were included in the same modeling analysis. Because of its proximity to LOS and CCS, the DRR source Stanton Station was also included in the same modeling analysis as a nearby source. Stanton Station was not required by the CD to produce SO<sub>2</sub> data early, but it was required later as a DRR source. The modeling for LOS and CCS thus included maximum impacts from Stanton, which also informed designation decisions for Stanton Station. The Stanton Station has since ceased operation and is not addressed in this review. The M.R. Young Station and the R.M. Heskett Station (Heskett) were modeled individually. The results of the modeling for the M.R. Young Station indicated the maximum design value was less than 50% of the SO<sub>2</sub> NAAQS. Therefore, in accordance with 40 CFR 51.1205(b)(2), this facility is not addressed in this review. The Antelope Valley Station (AVS) and the Great Plains Synfuels Plant were modeled together with the Coyote Station.

The required modeling analyses for the sources were submitted to EPA by the prescribed deadline. EPA approved the modeling analyses and their SO<sub>2</sub> data, and based on that data, EPA made the decision to designate areas of North Dakota surrounding these sources as "unclassifiable/attainment" for the 1-hour SO<sub>2</sub> NAAQS.

## **2. Procedure used for the Data Requirements Rule:**

According to the DRR (80 FR 51088), if an SO<sub>2</sub> source used allowable emissions in modeling to successfully demonstrate compliance with the SO<sub>2</sub> NAAQS, then the State is not required to submit future annual reports for that source. However, if an SO<sub>2</sub> source used actual emissions, as allowed by the DRR, to produce SO<sub>2</sub> data to support a designation decision, then the DRR requires additional action by the State to track the source in the future to make sure its emissions don't increase enough to exceed the 1-hour SO<sub>2</sub> NAAQS. In those instances, EPA requires tracking a source's actual emissions in the future to make sure it doesn't exceed the NAAQS.

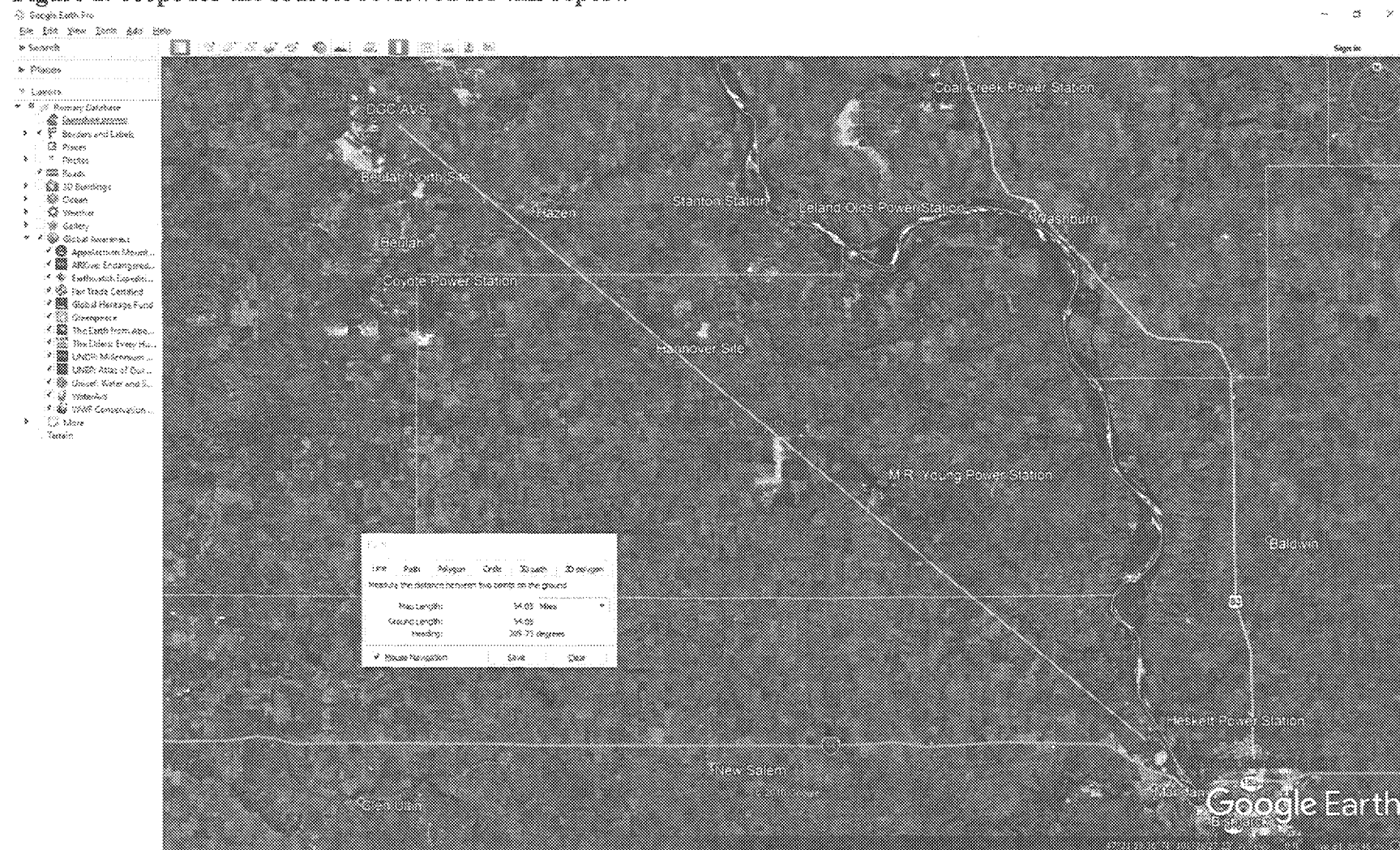
The scope of the Data Requirements rule is depicted in Figure 1 below. All EGU facilities are pinned in Red and the North Dakota Ambient Air Monitoring sites are pinned in Yellow. Three air monitoring sites are located within the scope of these sources found in this report. North Dakota State monitoring locations are as follows, Beulah North (38-057-0004), Hannover (38-065-0002) and Bismarck (38-015-0003). All three sites are equipped with SO<sub>2</sub> monitoring equipment, providing 1-hour SO<sub>2</sub> readings, 24-hours a day 365 days a year. All data from the Ambient Air Monitoring Sites are reported to EPA's AQS (Air Quality System) database.

Of the sources (plants) addressed in the modeling analyses, all used actual emissions (Coyote, CCS, AVS, GPSP, M.R. Young and Heskett), except LOS which used allowable emissions. Because LOS's owner, Basin Electric Power Cooperative, installed wet scrubbers and a new 600-foot stack in the middle of the 3-year period modeled (2012-2014), they didn't have three consecutive years of data using the new wet scrubber, which would be representative of current and future emissions at the plant. Instead, Basin Electric used a Best Available Retrofit Technology (BART) permit allowable emission rate in their modeling analysis.

Based on 40 CFR 51.1205(c), LOS does not need to be addressed in these future emissions tracking reports for the DRR, because of Basin Electric's use of allowable emissions for their sources in their modeling analyses. The other five sources addressed in this report used actual emissions, so they will be addressed here.

The DRR requires that, for sources that demonstrated compliance with the NAAQS using modeling based on actual emissions, the State must submit an annual report to EPA in July starting the calendar year after the effective date of a source's initial designation. Since the North Dakota sources (Coyote, CCS, AVS, Heskett and the Great Plains Synfuels Plant [GPSP] - not LOS) demonstrated compliance with the 1-hour SO<sub>2</sub> NAAQS using actual emissions data, the State must submit an annual report to EPA that documents each source's most recent annual emissions, provide an assessment of the reason(s) for any emissions increase from the previous year and provide a determination of whether air quality modeling would be needed to verify that the area around the source continues to comply with the 1-hour NAAQS.

**Figure 1. Scope for the sources reviewed for this report.**



For the sources' analyses, this essentially consists of addressing those sources' documented changes in emissions compared to what was used in the sources' modeling analyses. If the most recent year's annual emissions are lower than what was modeled, then the source's concentrations should still comply with the 1-hour SO<sub>2</sub> NAAQS. If the most recent year's annual emissions are higher than what was modeled, then the State must evaluate the emissions change to determine if the NAAQS is still maintained given the higher emissions or whether new modeling should be conducted to check the status of the source with increased emissions. Specifically, according to the DRR, the State must include a recommendation of whether additional modeling is needed to characterize air quality in the area to determine if the area still meets the SO<sub>2</sub> NAAQS.

The sources were modeled using hourly emissions based on their Continuous Emissions Monitoring System (CEMS) data. The most recent three years of data at the time, covering the 3-year period 2012-2014, were used in the modeling analyses. Thus, the most recent year of emissions data will be compared with these three years' data in the modeling report. The DRR specifies that the total annual emissions in tons for the DRR sources should be compared in this report.

The DRR specifies that the comparison of the annual emissions from the modeled years should be with annual emissions from the previous year. Based on this, annual emissions for the years 2012-2014 should be compared with annual emissions for the most recent year with final, approved data, 2018.

The North Dakota Department of Environmental Quality (NDDEQ) accessed the CAM AMPD database and evaluated the data for annual SO<sub>2</sub> emissions. The data on the AMPD include all North Dakota electrical generating units (EGUs) reporting for a given year except R.M. Heskett Station and GPSP. Data for these sources were taken from their Annual Emission Inventory Report.

### **3. Results and Summary for the Data Requirements Rule:**

The resulting annual emissions data for Coyote, CCS, Heskett, AVS and GPSP are displayed in Table 1 below for comparison. The table includes the annual totals for the modeled years 2012-2014 and the more recent years 2015-2018.

Table 1 indicates there is variability in emissions from year to year for these plants, but the general trend in recent years is downward. Most importantly, for all plants except Coyote Station, annual emissions from 2018 are lower than emissions for the years modeled, 2012-2014 (M.R. Young Station is not addressed in this review). The situation for Coyote will be addressed below.

**Table 1. Annual Total SO<sub>2</sub> Emissions (tons) for Modeled and More Recent Years**

COMPANY	PLANT	2012 (TONS)	2013 (TONS)	2014 (TONS)	2015 (TONS)	2016 (TONS)	2017 (TONS)	2018 (TONS)	2012-2014 Avg. Modeled Emissions	% Change Emissions Modeled vs 2018	2012-2014 MODELED DESIGN VALUES (µg/m <sup>3</sup> )
											Standard 196 (µg/m <sup>3</sup> )
BASIN ELECTRIC POWER COOP.	AVS 1	6,871	7,578	5,509	6,312	7,234	5,259	5,911	6,653	-11%	82
BASIN ELECTRIC POWER COOP.	AVS 2	7,035	6,076	6,975	6,717	5,089	7,603	6,126	6,695	-9%	
BASIN ELECTRIC POWER COOP.	LELAND OLDS 1	16,300	6,732	412	681	711	554	652	7,815	-92%	29
BASIN ELECTRIC POWER COOP.	LELAND OLDS 2	22,024	890	1,025	1,069	1,217	1,364	1,052	7,980	-87%	
MINNKOTA POWER COOP.	M.R. YOUNG 1	552	397	361	606	909	905	518	437	19%	80
MINNKOTA POWER COOP.	M.R. YOUNG 2	1,667	1,498	1,710	2,129	1,729	2,508	2,258	1,625	39%	
OTTERTAIL POWER CO.	COYOTE	10,639	12,579	12,777	8,786	11,873	13,444	14,913	11,998	24%	115
MONTANA DAKOTA UTILITIES	HESKETT 1	962	1,139	1,030	1,010	703	642	916	1,044	-12%	125
MONTANA DAKOTA UTILITIES	HESKETT 2	1,868	1,842	2,339	2,047	1,887	1,486	1,228	2,016	-39%	
GREAT RIVER ENERGY	COAL CREEK 1	8,032	8,242	7,885	7,667	7,643	3,096	3,458	8,053	-57%	103
GREAT RIVER ENERGY	COAL CREEK 2	8,241	7,340	7,940	7,776	5,633	3,296	3,400	7,840	-57%	
GREAT RIVER ENERGY	STANTON 1	2,245	1,931	2,493	2,076	2,412	395	0	2,223	Shutdown	161
This facility has been Permanently Shutdown											
GREAT RIVER ENERGY	STANTON 10	134	100	98	88	67	28	0	111	Shutdown	
DAKOTA GASIFICATION	GPSP	5,777	2,622	3,818	3,294	2,825	5,203	2,837	4,072	-30%	120

Shaded source has been permanently shutdown and decommissioned.

Note: Combined impact of Coyote, GPSP and AVS is 120 µg/m<sup>3</sup>.

Shaded source modeled with allowable emission rates.

As seen in Table 1, there is a 24% increase in emissions at Coyote in 2018 compared to the average of the years modeled (2012-2014). The increase in emissions is attributed to an increase in sulfur in the coal combusted and an increase in production. The increase in emissions might be of more concern if the maximum concentration in the vicinity of Coyote was close to the 1-hour SO<sub>2</sub> NAAQS; however, it is not. The maximum concentration (i.e., design value) in the vicinity of Coyote, based on the modeling that was approved by EPA, is 115 µg/m<sup>3</sup>, compared to the 1-hour SO<sub>2</sub> NAAQS of 196 µg/m<sup>3</sup>, which is only about 59% of the NAAQS. If emissions increased uniformly over all hours modeled, it would take an increase in emissions of more than 70% to exceed the NAAQS. Since the observed increase in emissions (from the 2012–2014 average) is only about 24%, the impacts from this emissions increase should be too small to even approach the standard, let alone exceed it.

Even though the model calculations are based on 1-hour averages, not annual averages, which are prone to short-term spikes, the design value for the NAAQS is based on the 3-year average of the daily maximum 4<sup>th</sup>-highest concentration over a year, which greatly shrinks potential concentration increases based on short-term spikes in emissions. Specifically, the SO<sub>2</sub> NAAQS is based on the 4<sup>th</sup>-highest value (99<sup>th</sup> percentile) over a year, not the 1<sup>st</sup>-highest value, which greatly reduces the potential impact of short-term spikes. Higher-ranked concentrations such as the 1<sup>st</sup>-highest to 3<sup>rd</sup>-highest values typically drop off much more quickly than lower values in the annual distribution, because they are more extreme values. Finally, the design value (the concentration compared to the NAAQS) is based on the 3-year average of three years of annual 4<sup>th</sup>-highest concentrations, which greatly smooths out spikes in one modeled year. The hourly emission rate and meteorological data for a 4<sup>th</sup>-highest concentration in one year are completely independent of those in other years, so there is no reason why a 4<sup>th</sup>-highest concentration in one year would increase the same as in another year.

After taking all this into account, even though the potential increase in the modeled design value for the 1-hour NAAQS could be somewhat higher than the 24% increase in annual emissions at Coyote since 2012-2014, an increase of more than 70% that would exceed the NAAQS would be practically impossible and extremely unlikely. Thus, based on our past experience it is our assessment that the observed annual increase in emissions of 24% at Coyote in 2018 should not cause an exceedance of the 1-hour SO<sub>2</sub> NAAQS, and the NAAQS should still be maintained in the vicinity of Coyote taking into account 2018 emissions data.

Given these facts regarding Coyote emissions and the clear downward trend in emissions at the other plants (and the fact that Stanton is permanently shut down), it appears evident that modeling for the sources continues to demonstrate compliance with the 1-hour SO<sub>2</sub> NAAQS. This review also takes into account more recent emissions data and the fact that all three of the Ambient Monitoring sites all show compliance with the 1-hour SO<sub>2</sub> NAAQS. If the design values for these plants still comply with the 1-hour SO<sub>2</sub> NAAQS using more recent emissions data, there is no need to update the modeling analyses for these plants. Consequently, the NDDEQ does not recommend performing any updated modeling analyses for these plants currently.

Given the above information, we believe that the plants modeled using actual emissions in the modeling analyses in North Dakota should not exhibit significantly higher design values that could

threaten the SO<sub>2</sub> NAAQS using more recent years of data, thus maintaining compliance with the 1-hour SO<sub>2</sub> NAAQS. Thus, the NDDEQ believes it has fulfilled the DRR's requirement for the current year to address the impact of more recent emissions for sources that addressed the DRR using modeling based on actual emissions.

FOR THE NORTH DAKOTA DEPARTMENT  
OF ENVIRONMENTAL QUALITY

Date 7/9/2019

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